Executive Summary

Implementation of Pilot Integrated Pest Management Programs in Indiana Schools and Child Care Facilities

By Al Fournier and Tami Johnson

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- Jerry Jochim, IPM Coordinator, Monroe County Community School Corporation
- Tami Johnson, Indiana Department of Environmental Management
- Dr. Marc Lame, Indiana University, School of Public and Environmental Affairs
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Report prepared by Al Fournier and Tami Johnson

Purpose

Indiana's more than 1,900 schools and 4,200 child care facilities are expected to provide safe, clean learning environments for nearly 1.5 million Hoosier children. Exposure to pests or to pesticides can pose health risks for children. Integrated Pest Management (IPM) is a system for reducing pests and pesticide exposure, and has been demonstrated as effective in school environments. This project involved a "partnership" between the Indiana Department of Environmental Management (IDEM), Indiana University's School of Public and Environmental Affairs (SPEA), Purdue University Entomology and the Monroe County Community School Corporation (MCCSC). The goal of the project was to develop IPM pilot programs in three Indiana school corporations and four Indiana child care facilities. This report briefly describes the project objectives, implementation, and outcomes, and concludes with a summary of lessons learned.

Introduction

For decades, pest control programs in schools and child care facilities have relied primarily upon chemical insecticides, rodenticides, and herbicides to manage pests in buildings and on grounds. In many cases, regular (e.g., monthly) applications of residual insecticides have been used for ongoing insect pest control in school buildings. This practice has been criticized as potentially hazardous to children and ineffective at eliminating pest populations.

A National Academy of Sciences report to Congress found that children are at greater risk from pesticide exposure than adults, due to differences in both physiology and behavior. Because children breathe more air, drink more water, and consume more food per pound of body weight than adults, they are more likely to take in pesticide residues. Also, due to behaviors such as crawling and hand-to-mouth activity, young children are more prone to incur higher aggregate exposure to pesticide residues (National Research Council 1993).

Integrated Pest Management (IPM) is a system for reducing pest problems through a variety of non-chemical and chemical techniques that minimize the potential negative impact on people and the environment. IPM has been demonstrated to reduce pests and pesticides use in public buildings and in schools around the country (Green and Breicsh 2002, EPA 1993). Although not required by law in Indiana, since March, 2001 adoption of IPM by schools has been encouraged through a model pesticide policy statement promoted by the Indiana School Board Association.

Objectives

1. To develop model IPM pilot programs in 3 Indiana public school corporations and 4 Indiana child care facilities.
2. To promote statewide adoption of IPM in schools and child care facilities.

Participating IPM Pilot Facilities

Schools

- Benton Community School Corporation, Benton County, Indiana
- Vigo County School Corporation, Vigo County, Indiana
- Monroe County School Corporation, Monroe County, Indiana

Child care facilities

- Monroe County United Ministries, Bloomington, Indiana
- Bloomington Developmental Learning Center, Bloomington, Indiana
- Elka Child Educational Center, Gary, Indiana
- Auntie Mame's Child Development Center, Indianapolis, Indiana

Methods: Steps in IPM program implementation

The process for implementing the pilot IPM programs described in this report followed what has become known as the Monroe IPM Model, authored by Dr. Marc Lame, Professor, Indiana University, School of Public and Environmental Affairs. The Monroe IPM Model outlines a series of implementation steps that have been successfully applied to initiate IPM programs in schools in several states. The Monroe IPM Model process is described in detail in

Appendix A: The Monroe IPM Model. It is noteworthy that this project represents an expansion of the model's transferability in its successful application to child care facilities.

Schools and child care facilities representing a mixture of urban, rural, and suburban conditions were identified, and facility administrators were contacted and invited to participate in the project. Each of the facilities agreed to commit time and resources to the IPM program, while the partnership agreed to provide IPM expertise, staff training and funds for a few start-up supplies. In addition, each of the cooperating facilities invited their current pest management service to participate in the program as full partners, and in every case, the providers agreed. A memorandum of understanding (MOU) between the participating pilot facilities and the "partnership" was drafted so that each party would have a clear understanding of the commitment and time that this project would involve. The MOU outlined participant's roles and responsibilities and was signed by the key players at the start of the project.

Initial IPM inspections were conducted in each pilot facility to document existing pest problems and pest-conducive conditions such as clutter, sanitation and maintenance issues. An initial interview with each facility's administrator provided information on pesticide use, current and previous pest problems, and administrative issues related to program implementation. A list of recommendations was generated for each facility based on inspections and interviews and provided to the contact administrator. Recommendations were reviewed in meetings held with key staff members and pest management professionals (PMPs), and action plans for implementation of recommendations were agreed upon. Follow-up inspection visits were conducted throughout the project by Purdue and SPEA staff to determine progress on IPM implementation. Staff meetings were held to acknowledge participant successes and to "fine tune" the program. At the close of the project term, final evaluations of the facilities were made, including visual inspections and, in some cases, telephone interviews with program participants.

IPM relies on pest monitoring by pest control technicians and staff instead of preventive pesticide treatments. Pest monitoring devices (e.g., sticky traps) and pest sighting logs were installed in each facility, and staff members and PMPs were trained in their use and record keeping. PMPs performed monthly inspections for pests and made recommendations for chemical or non-chemical control methods as needed. If pesticides were deemed necessary, PMPs provided these services according to the terms of the pilot project agreement. Purdue IPM specialists monitored the program and consulted with PMPs throughout the project on pest management issues.

Staff education about IPM practices was central to program success. Staff IPM trainings were conducted on a regular basis throughout the program. The staff included teachers, administrators, and maintenance personnel, cleaning crews and cooking staff. Pest control technicians (and in some cases company managers and owners) attended, and often assisted with, staff trainings. Trainings were often coupled with follow-up inspections and staff meetings to reduce travel expenses throughout the project.

IPM workshops for school administrators and personnel were held throughout the state (separate from the pilot project) and used peer-to-peer teaching by the MCCSC personnel (see below) to promote IPM adoption by public schools throughout Indiana. Near the end of the pilot program term, a demonstration workshop was held at 2 pilot child care facilities to educate other child care providers in the state about the benefits of IPM.

The Special Role of Monroe County Community School Corporation

It is important to mention that the Monroe County Community School Corporation (MCCSC) played a different role from the 2 other pilot schools in this project. MCCSC had already started to implement IPM practices throughout their schools when this project began. The intent of this project relative to MCCSC was to expand their current IPM program and to facilitate its use as a model for other schools to follow. Specifically, the MCCSC IPM program was used to demonstrate the benefits of IPM to public school administrators and staff around Indiana, and to serve as a model for the development of similar IPM pilot programs in 2 Indiana public school corporations and 4 Indiana child care facilities. MCCSC personnel played a critical role in the pilot project through mentoring the other pilot personnel who were just getting started.

Project Outcomes: Schools

Monroe County Community School Corporation

Since the MCCSC played a different role in this project than the other 2 pilot schools involved, direct comparison of MCCSC outcomes with the other pilots is not applicable. For this reason, the outcomes for MCCSC are presented in this section in a different format than that used for the other pilots.

MCCSC was demonstrating leadership in IPM prior to the initiation of this pilot project. MCCSC participants were truly partners in the project, sharing their experience from involvement in a successful school IPM pilot to provide leadership for the new IPM pilot facilities and for school administrators and personnel throughout the state. The MCCSC personnel worked closely with Purdue personnel and other project partners on aspects of workshop planning and delivery.

In addition to diffusing the successful MCCSC model to other public schools and child care facilities in Indiana, this project called for the enhancement of the existing program at MCCSC. This enhancement occurred in several different ways:

1. Workshop involvement of MCCSC personnel with IPM experience was beneficial to the pilot IPM program:

    a. Increased peer contact allowed MCCSC not only to share their IPM model with other school administrators and staff in the state, but also to learn first hand from them some of the strategies that work or don't work in their school systems. This information was used to "fine-tune" MCCSC's program.

    b. Despite having considerable expertise in IPM at the beginning of the workshops, MCCSC personnel were able to learn more about IPM through contact with IPM professionals at the workshops. These lessons allowed them to continually improve their own IPM program.

    c. MCCSC personnel took pictures at a number of schools that hosted the IPM workshops, which were used as examples of both good IPM practices and poor practices in trainings for MCCSC staff and others.

2. At the start of this project, MCCSC's IPM program dealt only with the management of indoor pests. Outdoor pests, such as weeds and grubs, were still dealt with using traditional pesticide methods. After an outdoor IPM workshop held in Bloomington in July, 2000, MCCSC began to expand their program to include management of outdoor areas.
3. MCCSC personnel have become involved in IPM issues on state and national committees to lend their expertise and perspective to the broader IPM diffusion efforts, both statewide and nationally.
4. MCCSC personnel now serve as telephone and email contacts for school administrators with questions about IPM. This "ask a peer" service helps to promote IPM implementation throughout the state.

Two New Pilot School Corporations

In each of the two participating school districts, three school buildings were selected as pilot IPM schools; the corporations encompassed two high schools, one middle school, and three elementary schools. Three of the schools were in urban Vigo County and three were in rural Benton County. Inspections of each of the pilot schools revealed a variety of pest control issues. With the exception of one school, facilities ranged from good to excellent condition with regard to pest management concerns. One school required serious sanitation upgrades to reduce pest-attracting conditions. The most common pests at the schools were yellowjackets (6 schools), ants (5 schools) cockroaches (4 schools) and mice (3 schools). The most common and important pest-related problems were clutter (6 schools), unsealed doors and other pest entry opportunities (6 schools), inadequate pest monitoring (6 schools), use of rodent baits (4 schools) and routine insecticide applications (6 schools).

Trainings

Because IPM relies heavily on the sanitation and maintenance activities of school personnel, staff training in IPM was critical to the success of the program. A total of 6 staff trainings were held for each of the two school systems during the pilot project. Over 300 school staff members received IPM training. Ongoing one-on-one communication with head custodians, site visits, and follow-up inspections supplemented formal trainings and provided pest problem solving as needed. Administrators and pest control contractors from both school systems commented that educating school staff improved communication and pest control in the IPM program. Some differences in training opportunities between the two school systems are discussed in the "Lessons Learned" section of this report (page 18).

Table 1: School System A

Date	Audience	Attendees
Aug. 25, 2000	Administrators	5
Sept. 18, 2000	Head Custodians	6
Oct. 10, 2000	Administrators	5
Oct. 26, 2000	All Custodians	22
Jan 29, 2001	Teachers, PMP	12
June 15, 2001	Head Custodians	8

Table 2: School System B

Date	Audience	Attendees
Sept. 28, 2000	Administrators, PMP	7

Feb 8, 2001	Head Custodians, PMP, Administrators	11
July 9, 2001	Administrators, PMP	8
Aug. 16, 2001	Kitchen staff	202
Sept. 5, 2001	Custodians	29
Sept. 5, 2001	Principals/Asst. Principals training	23

Facility Improvements

A key component of IPM is the reduction of pest potential through facility management practices. All of the pilot schools made significant improvements by reducing clutter, eliminating pest entryways ("pest-proofing") by replacing doors, installing door seeps, and caulking structural gaps. Improvements were also made in sanitation practices, particularly trash handling procedures. These changes contributed to a decrease in yellowjacket populations in the program's second year. The initiation of pest monitoring is also critical to IPM success when integrated into ongoing facility management. Facility maintenance and sanitation are ongoing issues for schools, and practices that are difficult to quantify. Nonetheless, the chart below provides estimates of facility improvements made during the pilot program. These estimates were made visual comparison of initial conditions, documented on the inspection report, to final conditions at completion of the pilots.

Pest Reduction

Both pilot school systems reported a reduction in pest control problems after implementing the IPM program. Because no pest monitoring program was in place prior to the IPM program, reduction in pest numbers were difficult to quantify. However, following program implementation, yellowjackets were reportedly lower at all schools, cockroach populations were reduced, and pest control operators received fewer "call back" requests for services.

Pesticide Reduction

An immediate reduction in potential pesticide exposure at all the schools occurred when the program was implemented, due to the discontinuation of residual insecticide treatments for cockroaches and other insect pests. The replacement of rodenticide baits in kitchen areas with snap traps and glue-board monitoring devices eliminated the risk of relocation or accidental consumption of rodenticide baits. PMPs reported that these pesticide reductions did not lead to any increases in pest problems. On the contrary, the IPM monitoring programs helped to quickly recognize and eliminate pest problems before populations got out of hand.

There was one instance of spray insecticide use in a school building during the IPM program. This was an application of a synthetic pyrethroid, to control oriental cockroaches in an enclosed crawl space, which was made during summer months when no students were present in the school. The oriental cockroach treatment was made by recommendation of the IPM team.

Table 3: Outcomes for School IPM Pilots

Practice	Range % of improvements made
Clutter reduction	50% - 60%
Reduction of cardboard storage	60% - 90%
Pest-proofing	60% - 80%
Sanitation improvements	20% - 80%
Trash handling improvements	70% - 70%
Insect monitoring program	100%
Pest Reduction	30% - 70%
Pesticide Reduction	80% - 90%

Other Program Outcomes

- PMPs working in both school systems reported that improved communication with school staff in the IPM increased staff cooperation in addressing pest-related maintenance issues.
- The school board at BCSC adopted a new pest control policy on May 14, 2001. Although this policy was not a direct outcome of the program, the final draft did reflect BCSC's awareness of IPM issues.
- The school board at VCSC adopted a new pest control policy on May 29, 2001. This policy specifically states that IPM will be used in all VCSC schools. Because of his experience in implementing IPM in the 3 pilot schools, the PMP was able to expand the program to all 40 VCSC schools.
- One of the PMPs involved in the IPM program commented that his involvement in the program influenced his practices in other accounts. He said that he is more cautious than before about pesticide use, and that he spends more time educating clients about how their management practices contribute to pest problems.

Project Outcomes: Child Care Facilities

Four child care facilities across Indiana were selected as pilot IPM facilities. Two of the facilities were in urban areas (Gary and Indianapolis) while two were in suburban Bloomington. The facilities varied considerably with regard to pest problems, pest control programs, and structural and maintenance issues. One of the facilities had few structural issues, while the other three needed significant pest-proofing. Two of the facilities had major amounts of clutter while the other two had only one or two cluttered areas. Two of the facilities had very few pest problems prior to the program, while the other two had active mouse and cockroach populations. One facility maintained a large community food bank and had occasional problems with stored product pests.

Trainings

A total of 20 trainings were held for about 80 child care staff, administrators, and PMPs during the pilot project period. In all, most trainings were attended by all teaching and kitchen staff from the pilot facilities. Ongoing one-on-one communication with facility directors and PMPs, site visits, and follow-up inspections supplemented formal trainings and provided pest problem solving as needed. Regular trainings reminded staff about their roles in the IPM program, and provided the opportunity to teach them about seasonal pest issues. Staff members generally enjoyed the trainings. Some facilities received more trainings than others, based on perceived need.

Table 4: Facility A

Date	Event/Audience	Attendees
Nov. 16, 2000	Ctr. Director, staff	15
Mar 1, 2001	Ctr. Director, staff	14
Aug. 29, 2001	Ctr. Director, staff	16
May 22, 2002	Demonstration Workshop	13

Table 5: Facility B

Date	Event/Audience	Attendees
Sept. 15, 2000	Ctr. Director, staff	17
Feb. 5, 2001	Ctr. Director, staff	19
Sept. 10, 2001	Ctr. Director, staff	19
May 22, 2002	Demonstration Workshop	13

Table 6: Facility C

Date	Event/Audience	Attendees
Nov. 30, 2000	Ctr. Director and Owner	3
Jan. 3, 2001	Ctr. Director, PMP	5
Jan 31, 2001	Ctr. Director, staff	13
Apr. 10, 2001	Ctr. Director, staff	12
Aug. 23, 2001	Ctr. Director, staff, students	95
Oct. 31, 2001	PMP	2
Apr. 22, 2002	Staff	13

Table 7: Facility D

Date	Event/Audience	Attendees
Aug. 10, 2000	Ctr. Director, staff	21
Oct. 6, 2000	Ctr. Director	1
Jan. 9, 2001	PMP	1
May 14, 2001	Ctr. Director, staff	20
May 22, 2001	PMP	2
Nov. 6, 2001	Ctr. Director, PMP, staff	22
Jan. 17, 2002	Ctr. Director, PMP, staff	25
Apr. 9, 2002	Ctr. Director, key staff members	3

Facility Improvements

All of the pilot facilities made significant improvements by reducing clutter, replacing cardboard with plastic containers, and "pest-proofing" facilities. Improvements were also made to playground areas and outdoor recycling areas. Pest sighting logs and pest monitoring devices were installed at the start of the program, and helped to improve communication between the facilities and their PMPs. Facility maintenance and sanitation are ongoing issues for child care facilities, and practices that are difficult to quantify. Nonetheless, the chart below provides estimates of facility improvements made during the pilot program. A low percent improvement in many cases indicated that initial conditions were outstanding. Nonetheless, we were able to determine progress within each pilot facility, by comparison of initial conditions, documented on the inspection report, to final conditions at completion of the pilots.

Pest Reduction

Pest problems at two of the child care facilities-those that had significant pests to begin with-were reduced. In these facilities, both mouse and cockroach populations were eliminated or greatly reduced after initiation of the IPM program. A third facility that had reported 'occasional invaders' such as ground beetles, crickets, and spiders, reported a reduction in these pests after sealing gaps under the doors. The fourth facility had very few pest problems before or during the program, except for occasional pantry pests. This facility experienced a problem with ants well into the IPM program. Although the problem was quickly resolved using IPM methods, the timing of the incident was such that pest numbers overall were higher after IPM than before.

Pesticide Reduction

The reduction in potential pesticide exposure in child care facilities varied, because of differences in pesticide practices prior to the program. The two facilities that were using monthly applications of preventive insecticides reported a dramatic decrease in pesticide use after the IPM program was implemented. In these two facilities, and in a third facility, the replacement of rodenticide baits in kitchen areas with snap traps and glue-board monitoring devices also contributed to the pesticide reduction. Two facilities rarely used pesticides prior to the IPM program, and so did not experience a decline in average pesticide use with IPM. In at least one instance, PMPs applied spray insecticides during the IPM program without consulting the IPM Team coordinator. The application was made to eliminate an ant invasion in a nursery area. This incident demonstrated that "old habits die hard" and that continual communication and follow-up are needed to educate clients and PMPs about IPM practices-particularly during the early stages of the program.

Child care facilities, unlike schools, are required to operate under licensing from the Indiana Family Social Services Administration (FSSA). FSSA requires that facilities be "pest free." The need to maintain a pest free environment may have been a contributing reason why two of the facilities we worked with were using preventative insecticide sprays at the beginning of the pilot project. To dispel misconceptions about the pest management value of such treatments, the IPM partnership trained the FSSA inspectors on IPM practices. We explained the potential hazards and limited pest management benefits of preventive spray treatments for indoor insect control and educated FSSA inspectors about the IPM alternative. Inspectors applied this knowledge as they inspected child care facilities throughout Indiana, advising child care administrators to eliminate preventative sprays, helping to reduce children's exposure to pesticides.

Table 8: Outcomes for School IPM pilot

Practice	Range % of improvements made
Clutter reduction	20% - 90%
Reduction of cardboard storage	20% - 80%
Pest-proofing	40% - 95%
Sanitation improvements	10% - 60%
Trash handling improvements	10% - 60%
Insect monitoring program	50% - 90%
Pest Reduction	10% - 90%
Pesticide Reduction	10% - 90%

Other Program Outcomes

- Child care facility directors reported increased staff awareness of how daily activities can affect pest problems. They also said that staff morale and pride in maintaining their areas increased as a result of the program.
- PMPs commented that involvement in the IPM program influenced their practices in other accounts. One company drafted a new pest management policy in January 2001, outlining a more cautious approach to pesticide use in schools and child care accounts, including a large urban school account with 20,000 children.
- Some important contacts in the child care industry were made as result of the pilot IPM programs. The Educational Coordinator at one of the facilities is President Elect for the Indiana Association for the Education of Young Children. Having seen the results of an IPM Program first hand, he will work to raise IPM awareness among child care professionals in the state. Contacts were also made with the President of the Child Care Professionals Network in northwest Indiana, which led to several presentation opportunities.
- On May 22, 2002, a workshop was held at to promote the diffusion of the IPM model to other child care facilities in the state through demonstration and peer-to-peer communication. A tour of two pilot facilities and presentations by facility directors outlined the costs, benefits, challenges and successes of the IPM program. The workshop was attended by childcare administrators and state children's health professionals.

Lessons Learned

This project was a positive step toward identifying some of the challenges of IPM implementation for schools and child care facilities. These challenges can be categorized as administrative challenges, education challenges, communication challenges, and pest management challenges. Some of the insights gained related to IPM implementation in schools are discussed below.

Insights from School IPM Pilot Programs

1. *Identification and persuasion of adopters.* The first step in initiating this program was the identification of school corporations that were willing to adopt IPM, at least on a trial basis. At the beginning of this project, IPM was virtually unknown among school administrators in the state. From the potential adopter's perspective, IPM, like any change in management practices, involves uncertainty, and therefore risk. The partnership's challenge was to identify those school administrators willing to accept this risk-the innovators-and to persuade them of the benefits of program adoption. Risks to adopters were mitigated, in part, by material resources and educational support made possible through this grant.

2. *Importance of Education.* The most component contributing to the success of the School IPM Pilot Programs was ongoing education of school administrators, staff, and pest management contractors throughout the project. The involvement of Monroe County Community School Corporation (MCCSC) partners on the IPM team was instrumental in convincing the pilot school administrators to engage in the IPM program. Without the prior success of the MCCSC program, it would have been difficult to persuade school corporations to adopt IPM. Education of school staff (custodians, maintenance personnel, kitchen staff, and teachers) is critical to the success of the program. Once they learned about IPM, staff members were more likely to fill out pest sighting reports and communicate any pest problems to the PMP. Trained staff members understood the roles of building maintenance and sanitation in pest management, and took responsibility for their areas. Education also increased staff enthusiasm about IPM and helped to nurture staff pride in their buildings.
3. *School organizational structure.* Differences in administrative procedures and organizational structure from one school district to another can have profound implications for IPM program implementation. In one of the pilot school corporations, the head custodian from each school reported to a central administrator, who viewed IPM as a priority. In the other school system, head custodians reported only to the principal of their own school building. In the second school system IPM trainings were more difficult to organize because central administration had to convince individual principals to release custodial staff for IPM training. School-level administrative support for IPM varied dramatically from one school to the next, which affected program implementation.
4. *Importance of communication.* One challenge of IPM implementation is the establishment of an ongoing system of communication between everyone involved. In the pilot programs this was achieved by designating a central contact for each school building. This person was responsible for communicating pest problems to the PMP and for following up with school staff on sanitation and/or building maintenance recommendations made by the PMP. Documentation (pest sighting logs, monitoring forms, and service report forms) was used to help establish a routine system of communication. However, it was difficult to obtain full cooperation from school staff or PMPs to achieve the level of record keeping required in an IPM program. People needed frequent reminding to put these tools to use. When communication broke down during the pilot programs, pest control issues went unresolved and both school staff and PMPs experienced frustration.

Insights from Child Care IPM Pilot Projects

The implementation of IPM programs in child care facilities poses a different set of challenges than implementation in schools. Some of the important issues we identified are described below.

1. *High staff turnover.* In the 4 child care facilities we worked with in this in this project, turnover of staff-including teachers and managers-was high. This is typical throughout the child care industry. This means that continuous training of staff will be required to maintain an IPM program. New staff should be introduced to IPM as part of "standard operating procedures" at the facility, and existing staff should be frequently reminded of the program. Turnover at the management level is even more troubling. In one child care pilot facility 3 different managers were designated to manage the IPM program in less than 2 years. There is a learning curve for IPM, particularly at the management level, and so this turnover can threaten program success.
2. *Hectic work environment.* Day-to-day operations at a child care facility focus on meeting the needs and promoting the well being of individual children, a very time-intensive and energy-consuming activity. The young children in a child care setting require more attention and management than older children in the school environment. Directors and managers of these facilities have to handle requests from staff, sign up and process new clients, welcome parents and address their questions and concerns, manage the budget, pay the employees, and deal with "emergencies" on an almost daily basis. In a typical meeting with one of our pilot child care administrators, an interruption every 2 to 3 minutes during a 30-minute meeting was not unusual. Management of the sort required in a good IPM program adds to an already stressed workday. It may be difficult for child care administrators to commit to taking on an IPM program. Considering these challenges, we were very fortunate in these pilot programs to have worked with some very effective and devoted managers.
3. *After-hours pest control.* Many facilities rely on pest management professionals to provide ongoing pest control services. In many cases, given concerns about potential exposure of children to pesticides, PMPs will service child care accounts on evenings or weekends. This arrangement makes sense if contractors are applying pesticides, however, it impedes communication with the facility administrator and can result in poor pest management. We found that monthly face-to-face communication between the facility manager and the pest control technician was important for IPM program success.
4. *Contracted services.* Many child care facilities contract a number of services that can affect pest management, for example, the use of contracted cleaning services instead of employing custodial staff. Cleaning crews typically come in after hours and have little communication with facility administrators. They will be contracted to empty trash and clean floors and restrooms, but often have no responsibility for ongoing maintenance such as cleaning floor drains or changing air filters. Sometimes these types of maintenance activities get lost in the day-to-day shuffle. In some of the pilot facilities, the cleaning crews would move the monitoring traps, which was be frustrating for the PMP's. Additional training is needed if a facility is contracting services like cleaning so that contracted staff are made aware of the facility's IPM policy and practice. It is important that facility administrators draft contracts that address maintenance and sanitation practices related to pest management.

5. *Materials management.* Clutter was the number one pest management issue at 2 of the 4 pilot child care facilities. Because of the educational mission of child care facilities, the age range of the children, and the variety of activities and materials needed to sustain a stimulating curriculum, there is a tendency for facilities to accumulate a lot of materials (books, art supplies, games, etc.). Donations of materials from parents and community members can contribute to this problem. In many cases, facility staff members do not realize that clutter can provide habitat for many pests. We recommend that child care facilities provide a reasonable amount of materials for children's activities and no more, and that materials be well organized, and stored in sealed plastic containers (not cardboard) when not in use. We recommended that the facilities come up with a policy for accepting donations and realize that they do not have to take every donation that is offered.
6. V*olunteer "help."* It was common among the child care facilities we worked with for repairs and renovations to be done by parents or community members on a volunteer basis. Although the donation of time and energy to facility improvement is admirable, we found, it was not always accompanied by adequate expertise in construction or in pest management issues. For example, shelves built by volunteers in 2 of the facilities were constructed of wood and built with the lowest shelf only a few inches above ground level, with the floor inaccessible for cleaning or pest inspections. The well-meaning assistance of community volunteers needs to be guided by a facility director or manager familiar with the required specifications for a given job.

Conclusions

The objectives of the IDEM grant for this project were met by the implementation of the pilot IPM programs in 3 school corporations and 4 child care facilities. The diffusion of IPM to schools and child care facilities throughout the state will be enhanced by the existence of model facilities with administrators and personnel who are experienced in IPM implementation. The school administrators and child care facility directors involved in this program have already become teachers of IPM to their peers. Peer teaching opportunities were provided in school and child care demonstration workshops funded by this grant. Contacts made during this project will continue to support IPM diffusion efforts in the state in various ways. These efforts will continue well beyond the termination of this particular project.

The expectations of what we would learn in the process of IPM program implementation were exceeded during this project. We hope that policy makers, change agents, educators, and IPM implementers will benefit from these lessons learned.

Additional Information

For additional information on this IPM Pilot Project or information on IPM, contact the Indiana Department of Environmental Management at 1-800-451-6027 press 0 ask for Tami Johnson, Environmental Health Coordinator, ext. 3-5628. Or visit the website at **www.in.gov/idem/envhealth**

Or contact Al Fournier, School IPM Coordinator, Purdue University 1-877-668-8IPM or visit the Purdue University IPM Technical Resource Center website at **http://www.entm.purdue.edu/schoolipm**

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Appendix A: The Monroe IPM Model

Dr. Marc Lame, Indiana University School of Public and Environmental Affairs

The Monroe IPM Model and Management Process

The Monroe IPM Model is a 22 step process reliant on intensive communication and partnership and based on sound pest management as practiced by national experts. Adjusting and enhancing the IPM management processes will allow increased diffusion and program success. The following is a description of the management processes critical to the 22 step "Monroe IPM Model" in the language of the participating change agents.

This model and any other information published in this report can be transferable for any other State environmental and health agency to implement to child sensitive facilities around the country.

1. Agree with the funding model

- Implement real IPM. Take this model to the EPA and request funding. Make a formal agreement using a grant proposal. One of the program goals should be to expand real IPM (defined previously).
- Plan on the model costing about 40K to implement.
- Have the school staff continue to carry out regular job duties – but will also focus on pests.
- Monitoring should be conducted by the school if possible.
- Have a definitive plan on what funding agencies are looking for in an IPM program. The agency makes a commitment on what to fund. The implementer must ask the agency what they want; agreeing means you are partnering.

2. Scout

- Strategically plan where the model can have the most success. Look for a well-managed school district to show the pilot model is successful.
- Look for good partners at all levels, not just the management levels. Look at the parents, organizations, etc. before starting the pilot.
- Pick a school that has opinion leaders, so that there is influence among their peers. Strategically pick something in terms of management and its ability to be transferred. It is our job to promote and develop IPM programs.
- Actively seek more representative school districts. Diffusion is sometimes salesmanship.
- Use strategic planning to achieve maximum impact towards area wide implementation.

3. Contacts

- Go to a school district that might be easy to work with and get in touch with "change agents" and see if they are interested.

4. Verbal commitment

- Start with the administrator and get buy-ins. Your initial contact in school administration will likely be facilities managers.
- Get administrator to say, "I need to try IPM in my schools".
- Establish lead: Determine who from the school district will be designated to make things happen.

5. Cooperate

- Tailor models to fit school district after contact is made, funding and implementers are in place.
- Identify well-managed pilot programs.

6. Sweeten the pot

- Try to mitigate the risk of adoption and let the school know what it will cost them.
- Make an offer for custodial staff to get overtime if possible.
- Give PR so the word can get out to parents about IPM.

7. Obtain a Memorandum of Understanding (MOU)

- Get a written agreement between all the partners. It does not have to be legally binding, but ethically it will boost the likelihood that the work will be done.
- Make sure the supervisor of the pest management program and your Pesticide Control Operator (PCO) are present at the beginning. This should be part of the MOU.
- Specify who does what and ensure that the right people are contacted.

8. Assessment/Audit of the School District in terms of Pests, pesticides, costs and policies

- Ask for the toughest schools in terms of pest management…look for the challenge.

a. Technical Assessment

- Conduct a written assessment of the school, including an audit of pest conducive conditions and existing pest management practices. A copy of the assessment should be provided to the school.

b. Management assessment

- Conduct a management assessment by collaborating with the facilities or business managers to access existing records, costs and policies pertaining to pest management.

9. Train the trainers

- Identify staff responsible for implementing change in the system

10. Train the school staff adopters

- Try to figure out a way to get on the teacher's agenda – make sure your delivery is fast and precise. If PCOs are involved have them attend the meeting.
- Explain why it is an innovation - it involves people's relationship with pests.

11. Monitor

- Monitor on a monthly basis at least.

*****This phase starts implementation*****

12. Introduce

- Conduct trainings or get the target audience newsletters to get everyone on the same page to continue and expand the program. Trainings / introductory material should include Power point, demonstration research for termaticides, press, newsletters, etc.

13. Newsletters

- Continue education. Disseminate electronically or put it on the school's website.

14.Mid-term evaluation

- Execute the evaluation in a timely fashion and report back to the school. It needs to be done quickly and follow up should happen for each action item listed.
- Keep it simple and get the schools response to issues brought up in the evaluation.
- Issue work orders.

15.Mid-term adjustment meeting

- Plan face to face meeting explaining the results of the mid-term evaluation and how the partners can adjust for program improvement.

16.Hand holding

- Walk school personnel them through the implementation process; at this point, the school is not sure what happens next. It takes lots of communication to overcome administrative hurdles.
- Analyze whether internal PCO functions work. If there are under 15 schools involved, they should contract with a PCO to internalize this budget wise. It might be difficult to justify this (40K) expenditure. Evaluate the PCO contract if there is one.

17.Integrate the PCO into the model and specific IPM standards

- Spend time with the PCO. If the PCO gets licensed, where do they gain the experience? Establish a quality control process.
- Define the PCO role and perform self- evaluations.

18.Final evaluation

- Implement mid-term evaluations into the report. State the percentage of compliance, pesticides used, money spent, and any other accomplishments.

19. District Expansion

- Decide if the school district will commit to go district-wide. This sometimes happens before the pilot is finished. Part of the model should state the stipulation: "If you decide to expand, we/you will assist the people in obtaining funding."
- Include ASBOs (Association of School Board Organizations).

20. Reward

- Recognize school districts on EPA website when they commit and incorporate real IPM into their districts. Plaques/certificates could be done through the grant. National recognition is extremely important, it should not be a competition, just recognition that they are doing IPM.

21. Area Wide Expansion

This part of the process takes just as much management as starting the initial program. It takes peers and partners.

- Put together a committee with parents that will push it forward. The parents can sell the idea. Some times this can work. It is an innovation for expanding the project. This should not be done at the initial phase, but works for expansion. Parents have clout and combined with a committee, their involvement can make a significant difference.
- Try to get district managers in at the start of the program.

22. Report

Draft a report – be sure to make the report credible and real. This document is basically an evaluation of the project. Make sure you send in the report.